IN THE CLAIMS:

1. (Currently amended) A mixed conductor in the form of a single material comprising inorganic electron conductor portions and inorganic proton conductor portions, the single material being formed by pyrolysis of a mixture comprising an organic precursor of the inorganic electron conduction portions and a proton conductor phase of inorganic electron conductor portions, said inorganic electron conductor portions being in the form of electron-conducting carbon skeletons and said inorganic proton conductor portions being stably fixed to said electron-conducting carbon skeletons ~~together~~ by at least one of covalent bonding, intercalation and inclusion, said mixed conductor exhibiting both electron and proton conduction at a temperature below 200° C.

2. (Previously presented) The mixed conductor according to claim 1, wherein said electron conductors are obtained by carbonizing at least one member selected from the group consisting of aliphatic hydrocarbons, aromatic hydrocarbons and derivatives thereof.

3. (Previously presented) The mixed conductor according to claim 2, wherein said at least one member is selected from the group consisting of polyacetylene, resorcinol, phenol, phenylphenol, polyaniline, polypyrrole, polythiophene, phenylphosphoric acid, phenylsilane alkoxide, pyrogallol, and dihydroxybiphenyl.

4. (Canceled)

5. (Previously presented) The mixed conductor according to claim 1, wherein said proton conductor portions contain at least one member selected from the ~~a~~ phosphorus-containing compounds, sulfur-containing compounds, carboxylic acids, boric acid and inorganic solid-state acids.

6. (Previously presented) The mixed conductor according to claim 1, wherein said electron conductor portions have consecutive carbon-carbon bonds including a carbon-carbon double bond.

7. (Previously presented) The mixed conductor according to claim 1, wherein said mixed conductor supports a noble metal catalyst.

8. (Previously presented) A mixed conductor in the form of a single material produced by pyrolysis and comprising inorganic electron conductor portions made of carbonaceous material obtained by carbonizing an organic precursor and inorganic proton conductor portions, said inorganic electron conductor and inorganic proton conductor portions being fixed together by at least one of covalent bonding, intercalation and inclusion, said mixed conductor exhibiting both electron and proton conduction at a temperature below 200° C.

9. (Previously presented) The mixed conductor according to claim 8, wherein the electron conductors are fixed to the proton conductors by a covalent bond.

10. (Previously presented) The mixed conductor according to claim 8, wherein the electron conductors are fixed to the proton conductors by intercalation.

11. (Previously presented) The mixed conductor according to claim 8, wherein the electron conductors are fixed to the proton conductors by inclusion.

12. (Previously presented) A method of producing a mixed conductor comprising:

a first step of obtaining a high molecular weight precursor by mixing and polymerizing at least one member selected from the group consisting of aliphatic hydrocarbon, aromatic hydrocarbon and derivatives thereof with a proton conducting material; and

a second step of burning the high molecular weight precursor, obtained in the

first step, in an inert atmosphere.

13. (Previously presented) A method of producing a mixed conductor comprising:

a first step of polymerizing at least one member selected from the group consisting of aliphatic hydrocarbons, aromatic hydrocarbons and derivatives thereof;

a second step of mixing a proton conducting material with the polymerized member to obtain a high molecular weight precursor; and

a third step of burning the high molecular weight precursor obtained in the first step in an inert atmosphere to convert the polymerized member to electron conducting portions.

14. (Previously presented) A mixed conductor producing method wherein an organic compound is bound or mixed with a compound having proton conduction to obtain a high polymer precursor, and said high polymer precursor is carbonized to thereby impart electron conduction to the precursor.

15. (Previously presented) The mixed conductor producing method according to claim 12, wherein said at least one member is selected from the group consisting of polyacetylene, resorcinol, phenol, phenylphenol, polyaniline, polypyrrole, polythiophene, phenylphosphoric acid, phenylsilane alkoxide, pyrogallol, and dihydroxybiphenyl.

16. (Previously presented) The mixed conductor producing method according to claim 12, wherein said proton conducting material is at least one member selected from the group consisting of phosphorus-containing compounds, sulfur-containing compounds, carboxylic acids, boric acid, and inorganic solid-state acids.

17. (Previously presented) The mixed conductor producing method according to claim 12, comprising a third step of supporting a noble metal catalyst on the product burned in said second step.

18. (Previously presented) The mixed conductor producing method according to claim 12, wherein the first step comprises heating the high molecular precursor or heating the high molecular precursor under a pressurized condition.

19. (Previously presented) The mixed conductor according to claim 1 exhibiting both electron and proton conduction at temperatures within a range of from room temperature to 60° C.

20. (Previously presented) The mixed conductor according to claim 1 wherein said electron and proton conductor portions are covalently bound in a single polymeric molecular structure.

21. (Previously presented) The mixed conductor according to claim 8 exhibiting both electron and proton conduction at temperatures within a range of from room temperature to 60° C.

22. (Previously presented) The mixed conductor according to claim 8 wherein said electron and proton conductor portions are covalently bound in a single polymeric molecule structure.

23. (Currently amended) The mixed conductor according to claim 1 wherein the electron-conducting carbon skeletons ~~conductor portions~~ are ~~carbon skeletons~~ bridged by the proton conductor portions.

24. (Previously presented) The mixed conductor according to claim 8 wherein the electron conductor portions are carbon skeletons bridged by the proton conductor portions.

25. (Canceled)

26. (Previously presented) The mixed conductor according to claim 1 wherein the mixed conductor is a single compound.

27. (Previously presented) The mixed conductor according to claim 8 wherein the mixed conductor is a single compound.